

Abstract: Fine particulate matter (PM_{2.5}) air pollution is one of the main environmental health problems in developed countries. According to modeling estimates the PM_{2.5} concentrations in Poland are among the highest in Europe. In this article we focus on exposure assessment and estimation of adverse health effects due to PM_{2.5} air pollution. This article consists of two parts. In the first part, we discuss the main methods used to estimate emission-exposure relationships and adverse health effects due to PM_{2.5} air pollution. In the second part, we present an assessment framework for Poland. We illustrate this framework by estimating the premature deaths and change in life expectancy in Poland caused by anthropogenic, primary PM_{2.5} emissions from different European countries, and, in proportion, the premature deaths in different European countries caused by primary emissions from Poland. The PM_{2.5} emissions were evaluated using the inventory of the European Monitoring and Evaluation Programme (EMEP). The emission-exposure relationships were based on the previously published study and the exposure-response functions for PM_{2.5} air pollution were estimated in expert elicitation study performed for six European experts on air pollution health effects. Based on the assessment, the anthropogenic primary PM_{2.5} from the whole of Europe is estimated to cause several thousands of premature deaths in Poland, annually. These premature deaths are both due to PM_{2.5} emissions from Poland and transportation of PM_{2.5} from other European countries, both of these in almost equal parts. The framework presented in this article will be developed in the near future to a full scale integrated assessment, that takes into account both gaseous and PM air pollution.